# Forest Health Protection
## Pacific Southwest Region

**Date: October 21, 2011**
**File Code: 3420**

**To: District Ranger, Oak Knoll Ranger District, Klamath National Forest**

**Subject: Evaluation of bark beetle activity in the Fish Meadow Restoration (FHP Report N11-12)**

At the request of Carol Sharp, District Silviculturist, a field evaluation of the Fish Meadow Restoration Project was conducted on June 21, 2011. The objectives were to assess the current stand conditions, evaluate the project for potential funding through the Forest Health Protection (FHP) Western Bark Beetle Initiative. Carol Sharp (Klamath NF), Todd Drake (Klamath NF), Cynthia Snyder (FHP) and Pete Angwin (FHP) were in attendance.

## Background

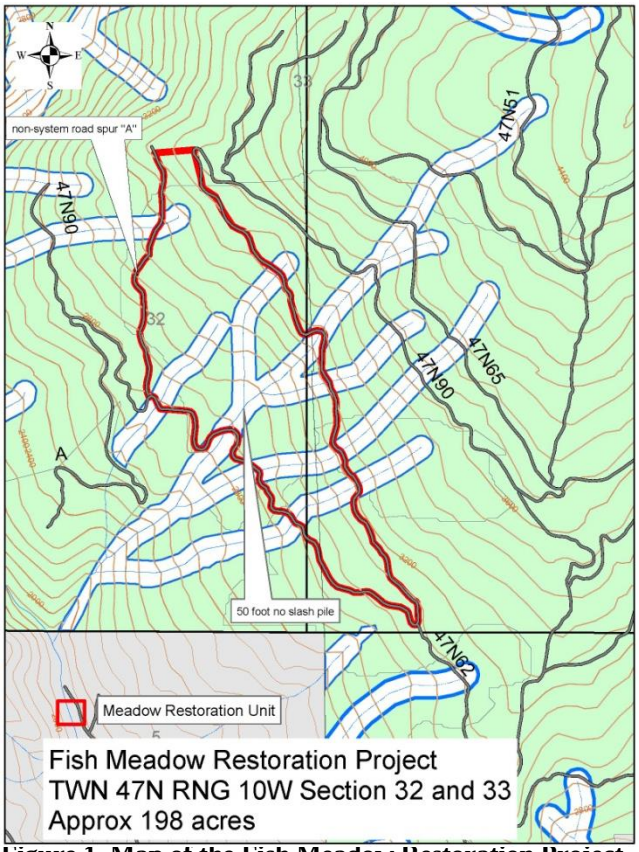


**Figure 1. Map of the Fish Meadow Restoration Project area with riparian reserve buffer zones outlined.**

The Fish Meadow Restoration Project area (198 acres) is located in the Middle Creek drainage 6 miles north of the Klamath River, midway between the Oak Knoll (8 miles east) and Seiad (8 miles west) Work Stations (T47N, R10W, Mt. Diablo Meridian, sections 32 and 33). Elevation is between 2,800-3,500 feet. The Fish Meadow Restoration Project is directly adjacent to a commercial thinning project planned for 2012 (Middle Creek Thin). Together these projects would treat a substantial portion of the west aspect of this watershed.

The stands to be thinned are mixed conifer natural stands consisting of ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), sugar pine (*P. lambertiana*), incense cedar (*Libocedrus decurrens*) and California black oak (*Quercus*


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*kelloggii*). Current stocking is 1,974 trees per acre with a basal area of 215 $ft^2$/ac and an SDI of 532. Current diameters range from 0 to greater than 50 inches DBH. After thinning, the residual diameters would range from 9 to greater than 50 inches.

**Figure 2. Overstocked conditions, gentle slopes and road access makes these stands good candidates for partnering with the Goosenest RD to use existing equipment for thinning at a reduced cost.**

The project will meet multiple resource objectives and is an opportunity to partner with several Forest Service resource program areas as well as non-government organizations. The areas to be thinned in 2012 were chosen for the gentle slopes so thinning could be accomplished with a small posi-track machine. An agreement has been made with the Goosenest RD, Klamath NF, to do the work for $250/ac. Further funding has been requested for the 2012 budget through FS wildlife funds (NFWF), as well as partnerships with Rocky Mountain Elk Foundation ($40,000), National Wildlife Turkey Federation ($10,000) and California Deer Association ($10,000).

**Figure 3. Meadow restoration and habitat improvement provide partnering opportunities with Fish and Wildlife Service and many non-government wildlife organizations.**

The objective of the project is to reduce the stand density while maintaining pine and oak within the mixed conifer stand, to improve the wildlife habitat, and to reduce the risk of competition-induced mortality, insect outbreak and wildfire. Historically, this stand contained a higher percentage of pine and oak. The natural fire return interval in the area is approximately 8 to 20 years; however, the Fish Meadows area has not burned for around 100 years. The result has been that the stand is overstocked with small and moderated-sized trees. Some pockets of ponderosa pine mortality and scattered sugar pine mortality caused by bark beetles exists within the project area. Morality has been occurring for several decades. This project in combination with the Middle Creek project would treat a substantial portion of the west slope aspect of the high priority Middle Creek watershed.

## Observations

**Figure 3. Overstocked stands on gentle slopes (<35%) provide opportunity for small-machine thinning.**

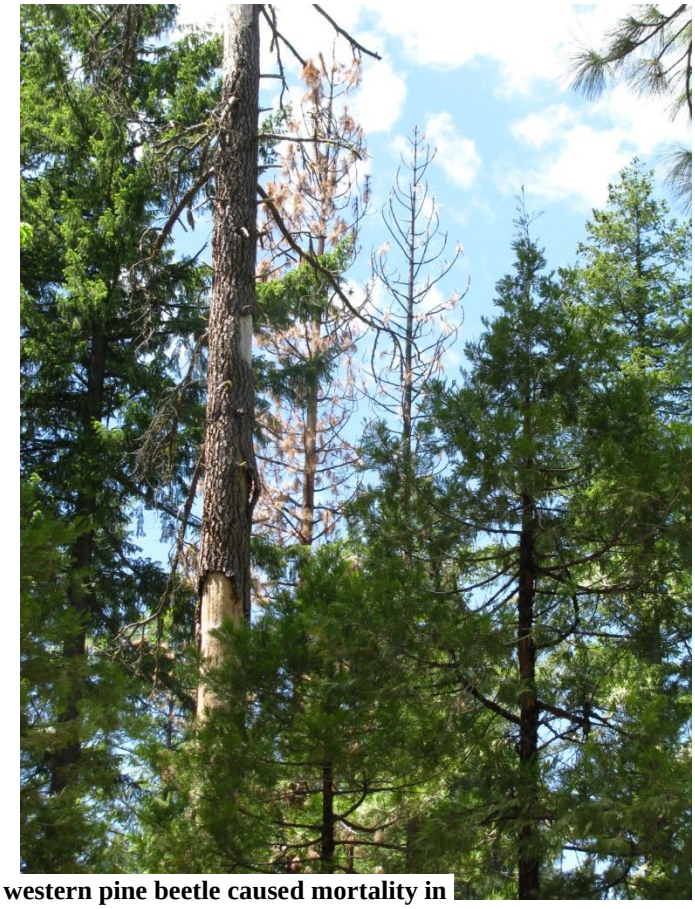

**Figure 4. Pocket of western pine beetle caused mortality in ponderosa pine.**

Stand conditions in the forested areas outside of the riparian reserves are overstocked (Figure 4). Current BA is 200-400 $ft^2$/ac with diameters ranging 6-56 inches DBH. Stand Density Index is currently about 532, probability of mortality at this level is 40-50%. Pockets of western pine beetle (*Dendroctonus brevicomis*) caused mortality were found scattered through the stands (Figure 5). Most of the affected trees are mature, 14-28 inches in diameter. These pockets ranged from single tree to one acre in size with six current hits and many older dead and down indicating that the beetle has been active in the stands for many years.

Stem and butt rots were also found on the site. Pini conks were found on mature ponderosa pine and Schweinitzii conks were found on at the base of a large (40 inch DBH) sugar pine. Douglas-fir dwarf mistletoe was also seen.

This proposal is to thin conifers and hardwoods and treat slash on 80 acres across a 198 acre project using a small posi-track machine in 2012. All trees up to 9 inches DBH, except black oak and sugar pine, would be cut. There would be additional thinning around pines larger than 30 inches DBH; all trees up to 9 inches DBH regardless of species would be cut within a 50-foot radius of these larger pines. Wildlife biologists heading the project have a species preference for residuals of hardwoods (where they exist), sugar pine, ponderosa pine, then Douglas-fir, incense cedar then white fir. It is suggested that this is historically pine/oak habitat with a large (fish-shaped) meadow within the riparian reserves.

It was suggested that maintaining some species diversity in the conifers would be beneficial in reducing risk of bark beetle caused mortality. Thinning trees less than 9 inches would reduce density index by nearly half. This would bring the probability of mortality down to 25-35%. This is a good partnering opportunity that will reduce bark beetle risk and benefit wildlife habitat.

**Discussion**

As modeled by FVS, this treatment would reduce the average stocking to 144 TPA, 184 sq. feet BA/ac, an SDI of 270, and raise the QMD to 14.6 inches. As noted by Oliver (1995), an SDI of 230 defines the threshold for the zone of imminent bark beetle mortality in pines in which endemic populations kill a few trees, but net growth is still positive. The limiting SDI for ponderosa pine stands in northern California as defined by Dendroctonus bark beetles is 365.

The proposed 80 acres is the first phase of a larger project that includes another 120 acres of hand thinning in 2013 and underburning of the entire 200 acres to be completed within the next 4-6 years. The proposed underburning in combination with the precommercial thinning would reduce the SDI to 244 (57% of the maximum SDI) by reducing the stocking by another 27 TPA and reducing the basal area to 171 sq. feet/ac. Small opening (less than 0.5 acres) will be created throughout the project area to improve habitat for large and small game animals. With the thinning followed by underburning, the SDI would remain below 60% of the maximum for a period of 20 years, greatly reduce the susceptibility to bark beetles, and meet regional direction regarding density related forest health issues.

**Summary**

The proposed treatments, if fully implemented, will be effective in addressing concerns regarding bark beetles, fire and drought, and will meet the Regional Forester's density management policy that high risk density levels will not be reached again for at least 20 years. I fully support the treatments as described.

If you have any questions regarding this report and/or need additional information, please contact Cynthia Snyder at 530-226-2437 or Pete Angwin at 530-226-2436.

/s/ Cynthia Snyder

Cynthia Snyder, Entomologist
Northern California Shared Service Area

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**Table 1 Supporting Details Table**

| Supporting Details | |
|---|---|
| Forest Type | Natural mixed conifer stands |
| Location | Matrix |
| Risk Map | Moderate to high risk for bark beetle mortality |
| Watershed Classification | Middle Creek Watershed |
| Landscape Treatment | The Fish Meadows project includes a total of 200 acres of thinning and underburning. The Fish Meadows project is directly adjacent to a commercial thinning project planned for 2012 (Middle Creek Thin). Together these projects would treat a substantial portion of the west aspect on National Forest within this watershed. |
| Proposed Treatment | Mechanical thinning on 80 acres |
| NEPA | Fish Meadow Restoration (in process) |
| Proposed Acres | 80 |
| Requested Funding | $10,000 |
| Total Cost Per Acre | $250 |
| Matching Funding | Matching funding would include $150/ac of Forest Service wildlife funds. Proposals also submitted to the Rocky Mt. Elk Foundation and for turkey and deer habitat funding. |
| Species Composition | Ponderosa pine, Douglas-fir, sugar pine, incense cedar, California black oak, madrone and a small amount of white fir regeneration. |
| Current Diameters | 0-56 inches DBH; QMD 4.7” |
| Residual Diameters | 9-56 inches DBH; QMD 14.6” |
| Current Stocking | Average stocking of 1,974 trees per acre, BA of 215 $ft^2$/ac, and SDI 532 |
| Target Stocking | 144 TPA, BA of 171 $ft^2$/ac and SDI of 270. After the proposed underburning, the stocking will be reduced to 117 TPA, BA 160 and SDI 244. |
| Agents of Concern | Dendroctonus bark beetles (western pine beetle and mountain pine beetle) |
| Recent Activity | Several pockets and scattered tree mortality from western pine beetle in PP and from mountain pine beetles in SP. |

| Supporting Details | |
|---|---|
| Current Susceptibility | High due to overstocking of large diameter trees. |